CHAPTER 5

Nuclear, Biological, And Chemical Warfare

GENERAL

Nuclear, biological, and chemical (NBC) weapons can cause casualties, destroy or disable equipment, restrict the use of terrain, and disrupt operations. You must be prepared to fight and survive in an environment where NBC weapons have been used.

This chapter prescribes active and passive protection measures that will avoid or reduce the effects of NBC weapons.

CONTENTS

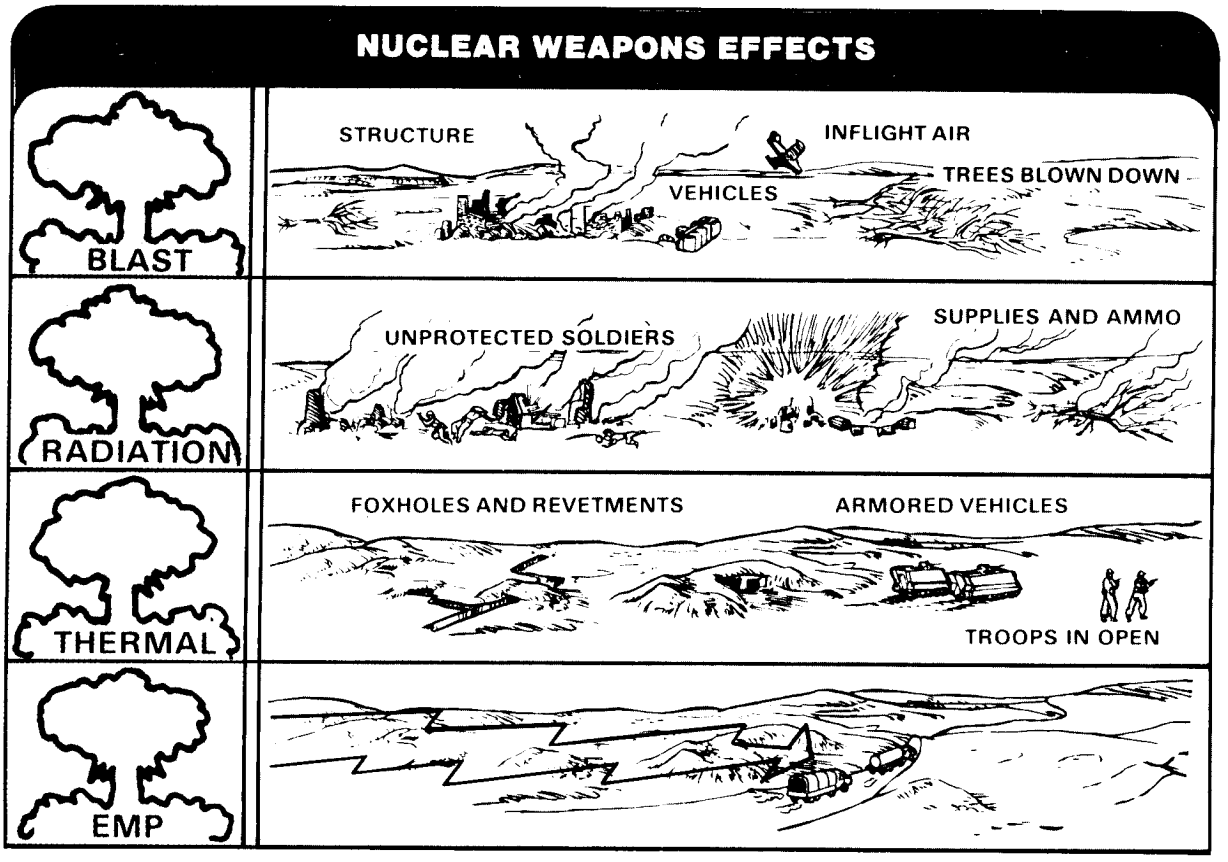
NUCLEAR WEAPONS

This section describes the characteristics of nuclear explosions and their effects on soldiers, equipment, and supplies, and gives hasty measures for protection against nuclear attacks.

CHARACTERISTICS OF NUCLEAR EXPLOSIONS

The four main characteristics of **nuclear explosions are:**

- **BLAST (an intense shock wave).**
- **THERMAL RADIATION (heat and light).**
- **NUCLEAR RADIATION (radioactive material).**
- **EMP (electrical power surge).**



Blast produces an intense shockwave and high winds that create flying debris. It may collapse shelters and some fighting positions.

Thermal radiation causes burns and starts fires. The bright flash at the time of the explosion can cause a temporary loss of vision or permanent eye damage if you look at the explosion, especially at night.

Nuclear radiation can cause casualties and delay movements. It may last for days and cover large areas of terrain. It occurs in two stages: **initial and residual.**

- **Initial radiation is emitted directly from the fireball in the first minute after the explosion. It travels at the speed of light along straight lines and has high penetrating power.**
- **Residual radiation lingers after the first minute. It comes from the radioactive material originally in a nuclear weapon or from material, such as soil and equipment, made radioactive by the nuclear explosion.**

EMP is a massive surge of electrical power. It is created the instant a nuclear detonation occurs and is transmitted at the speed of light in all directions. It can damage solid-state components of electrical equipment (radios, radars, computers, vehicles) and weapon systems (TOW and Dragon). Equipment can be protected by disconnecting it from its power source and placing it in or behind some type of shielding material (armored vehicle or dirt wall) out of the line of sight to the burst. If no warning is received prior to a detonation, there is no effective means of protecting operating equipment.

EFFECTS ON SOLDIERS

The exposure of the human body to nuclear radiation causes damage to the cells in all. parts of the body. This damage is the cause of "radiation sickness." The severity of this sickness depends on the radiation dose received, the length of exposure, and the condition of the body at the time. The early symptoms of radiation sickness will usually appear 1 to 6 hours after exposure. Those symptoms may include headache, nausea, vomiting, and diarrhea. Early symptoms may then be followed by a latent period in which the symptoms disappear. There is no first aid for you once you have been exposed to nuclear radiation. The only help is to get as comfortable as possible while undergoing the early symptoms.

If the radiation dose was small, the symptoms, if any, will probably go away and not recur. If the symptoms recur after a latent period, you should go to an aid station.

EFFECTS ON EQUIPMENT AND SUPPLIES

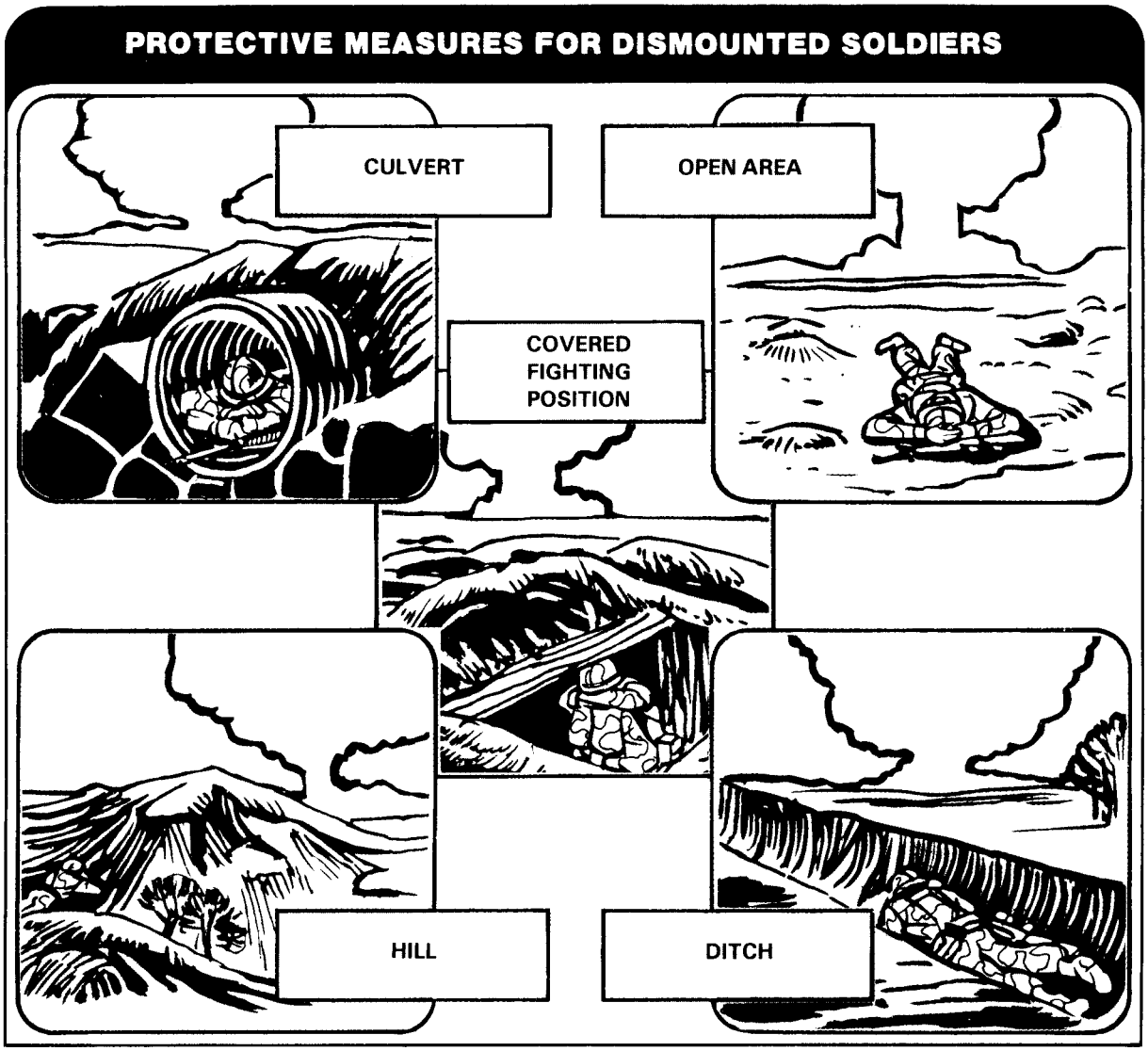
Blast can crush sealed or partly sealed objects like food cans, barrels, fuel tanks, and helicopters. Rubble from buildings being knocked down can bury supplies and equipment.

Heat can ignite dry wood, fuel, tarpaulins, and other flammable material. **Light** can damage eyesight.

Nuclear radiation can contaminate food and water.

PROTECTION AGAINST NUCLEAR ATTACKS

The best hasty protection against a nuclear attack is to take cover behind a hill or in a fighting position, culvert, or ditch. If caught in the open, drop flat on the ground at once and close your eyes. Cover exposed skin and keep your weapon under your body to avoid loss. If you know the direction of the burst, drop with your head away from the burst. Stay down until the blast wave passes, then check for injuries and equipment damage and prepare to continue the mission. See chapter 2 for additional considerations in the building of your fighting positions.



Radiation is the only direct nuclear effect that lingers after the explosion. As it cannot be detected by the senses, use radiac equipment to detect its presence. Procedures for detection can be found in FM 3-12 and FM 21-40. When feasible, move out of the contaminated area.

If your unit must stay in the contaminated area, it is best to stay in a dug-in position with overhead cover. When time does not permit constructing a well-prepared overhead cover, use a

poncho. Stay under cover. When the fallout has finished falling, brush contamination off yourself and your equipment. Wash yourself and your equipment as soon as the mission permits.

CHEMICAL AND BIOLOGICAL WEAPONS

Enemy forces have both chemical and biological weapons. These weapons may be used separately or together, with or without nuclear weapons. Regardless of how they are used, you must be able to survive their effects and continue your mission.

CHARACTERISTICS OF CHEMICAL AND BIOLOGICAL AGENTS AND TOXINS

Chemical agents are like poisonous pesticides, but are far more powerful. They are meant to kill or injure you and are released to cover large areas. They may be released as gases, liquids, or sprays. The enemy may use a mixture of agents to cause confusion and casualties. Artillery, mortars, rockets, missiles, aircraft, bombs, and land mines can deliver the agents.

Biological agents are disease-producing germs. They create a disease hazard where none exists naturally. They may be dispersed as sprays by generators, or delivered by explosives, bomblets, missiles, and aircraft. They may also be spread by the release of germ-carrying flies, mosquitoes, fleas, and ticks. The US Army does not employ these agents, but other armies may.

Toxins are poisonous substances produced by living things (such as snake venom). Toxins are not living things and in this sense are chemicals. They would be used in combat in the same way as chemical-warfare agents, and they may disable or kill without warning.

EFFECTS ON EQUIPMENT

Chemical and biological agents have little direct effect on equipment. Liquid chemical agents on your equipment can restrict its use until it is decontaminated.

EFFECTS ON TERRAIN

Liquid chemical agents may restrict the use of terrain and buildings.

It is difficult to decontaminate terrain. When time permits, it is best to wait for weather to decontaminate terrain naturally. Contaminated areas should be either bypassed or, when protective equipment is worn, crossed. After crossing a contaminated area, decontaminate yourself and your equipment as soon as the situation permits.

EFFECTS ON SOLDIERS

Chemical and biological agents may enter your body through your eyes, nose, mouth, or skin. They can disable or kill.

Liquid agents may be dispersed on you, your equipment, the terrain, and foliage. The agents may linger for hours or days and endanger you when you are unprotected.

Biological agents are hard to detect in early stages of use. If you find out or suspect that the enemy is using biological agents, report it to your leader.

The M8 automatic chemical-agent alarm can detect the presence of chemical agents in the air and produce an audible or visual signal. It will detect nerve, blood, and choking agents. The M43A1 detects only nerve-agent vapor. The use and maintenance of the M8 alarm is the responsibility of the unit NBC defense team.

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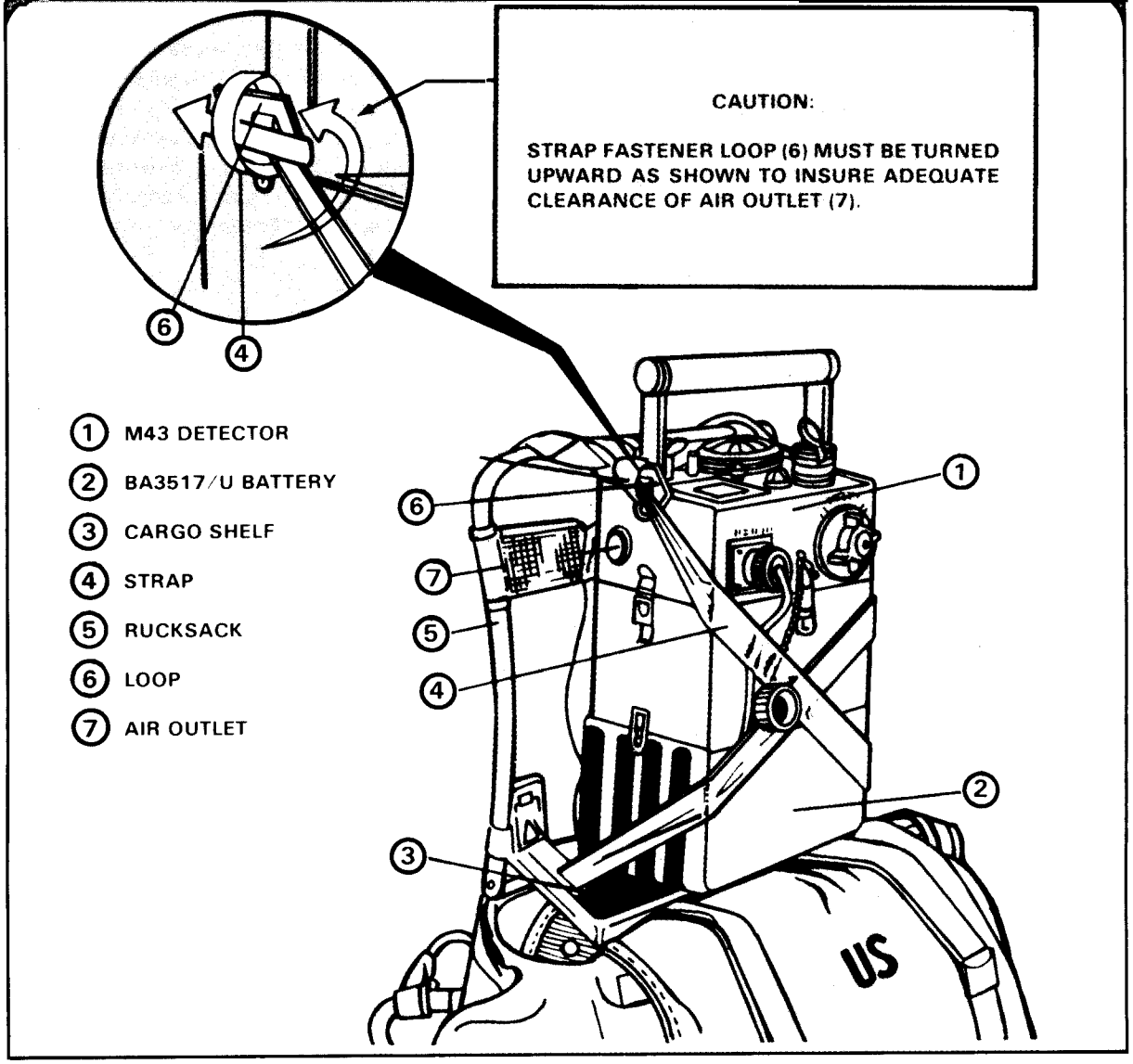
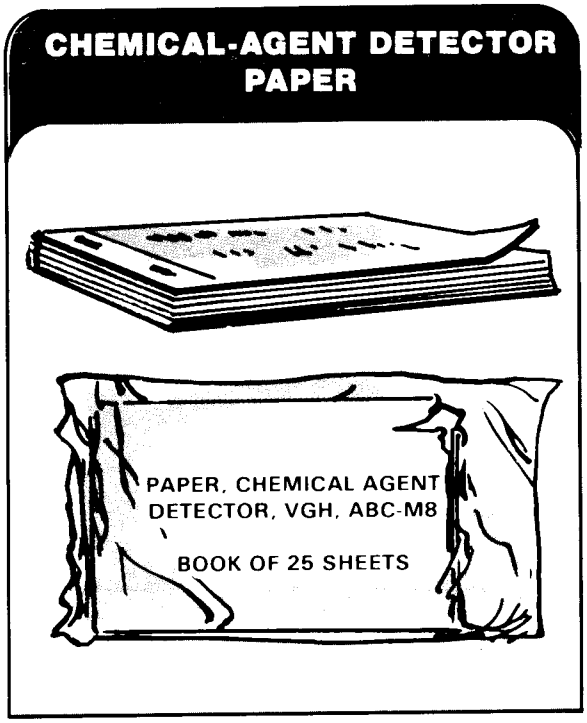
DETECTION OF CHEMICAL AND BIOLOGICAL AGENTS

Your senses may not detect chemical agents, as most agents are odorless, colorless, tasteless, and invisible in battlefield concentrations. However, you can detect chemical agents by using the chemical-agent alarms and detection kits found in each company (FM 21-40).

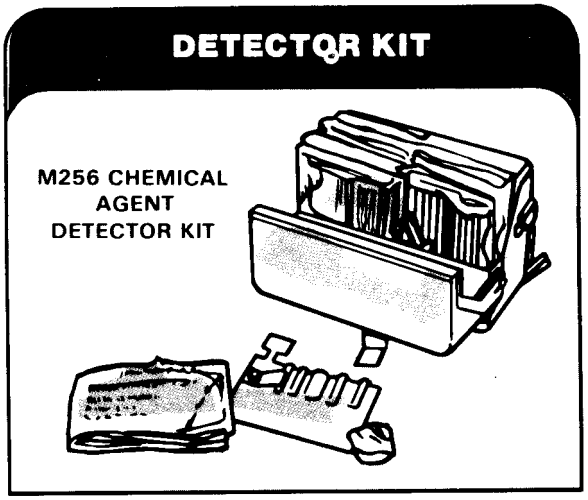
CHEMICAL-AGENT ALARM



The ABC-M8 chemical-agent detector paper comes in a booklet of 25 sheets. It is a part of the M256 chemical-agent detector kit. The paper sheets turn dark green, yellow, or red on contact with liquid V-type nerve agents, G-type nerve agents, or blister (mustard) agents, respectively they do not detect vapor, The test is not always reliable on porous material such as wood or rubber. Many substances (including some solvents and decontaminants) can cause a color change in the paper, so such a change indicates only that a chemical agent may be present. Positive detector-paper tests should be verified by testing with chemical-agent detector kits.



The M256 chemical-agent detector kit is issued to squads. It is used to detect dangerous vapor concentrations of nerve, blister, or blood agents. It should be used when the platoon or company is under chemical attack, when a chemical attack is reported to be likely, or when the presence of a chemical agent is suspected.



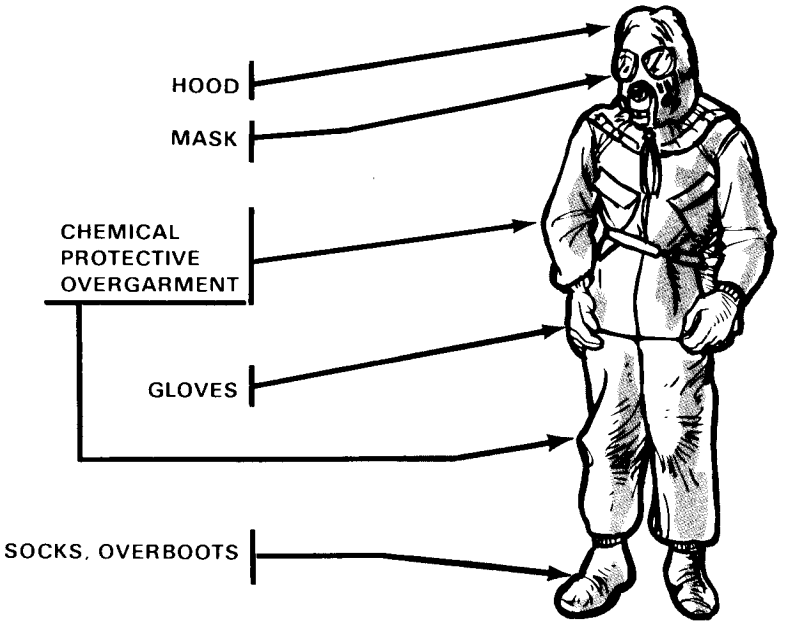
ALARMS

If you recognize or suspect a chemical or biological attack, STOP BREATHING, PUT YOUR MASK ON, CLEAR AND CHECK IT, AND GIVE THE ALARM set by your unit's SOP.

PROTECTION AGAINST CHEMICAL AND BIOLOGICAL ATTACKS

Protective Equipment. Your main protection against a CB attack is your protective mask. It keeps you from inhaling chemical or biological agents. Additionally, protective clothing will provide protection from liquid agents. Protective clothing includes the mask with hood, the chemical protective suit (overgarment), boots, and gloves.

PROTECTIVE CLOTHING AND EQUIPMENT



Protection from Insects. The duty uniform and gloves protect you against bites from insects such as mosquitoes and ticks that may carry disease-causing germs. Keep your clothes buttoned and your trouser legs tucked into your boots. Covering the skin reduces the chances of an agent entering the body through cuts and scratches. It also keeps disease-carrying insects from reaching the skin. Insect repellents and insecticides are effective against most disease-carrying insects. High standards of sanitation also protect against some insects.

Mission-Oriented Protective Posture. MOPP is a flexible system of protection against chemical agents. Your leader will specify the level of MOPP based on the chemical threat, workrate, and temperature prior to performing a mission. Later, he may direct a change in MOPP according to the changing situation.

The MOPP level determines what equipment you must wear and what you must carry. The standard MOPP levels are shown in the following chart.

MOPP LEVELS

MOPP	PROTECTIVE EQUIPMENT			
	OVERGARMENT	OVERBOOTS	MASK/HOOD	GLOVES
1	Worn opened or closed based on temperature.	Carried	Carried	Carried
2	Same as MOPP 1	Worn	Carried	Carried
3	Same as MOPP 1	Worn	Worn, hood opened or closed based on temperature	Carried
4	Worn, closed	Worn	Worn	Worn

The best local defense against biological warfare is strict preventive medical and sanitation measures and high standards of personal hygiene.

Chemical Attack. When an individual displays the symptoms of chemical-agent poisoning, first aid must be given immediately to save his life.

Nerve agents. The symptoms of nerve-agent poisoning are difficult breathing, drooling, nausea, vomiting, convulsions, and sometimes dim vision. The use of atropine autoinjectors and artificial respiration are first-aid measures for nerve-agent poisoning. If you have such

symptoms, inject yourself with one injector in the thigh. If symptoms persist, use another injector. The interval between injections is 15 minutes. If you are unable to treat yourself, a buddy must do it for you. He will inject three injectors at once and administer artificial respiration, if necessary. No more than three atropine autoinjectors will be given. Seek medical aid quickly.

Blister agents. The symptoms of blister-agent poisoning are burning sensations in the skin, eyes, and nose. The symptoms may be immediate or delayed for several hours or days, depending on the type of agent used. If blister agents come in contact with the eyes or skin, decontaminate the areas at once. Decontaminate the eyes by flushing them repeatedly with plain water. Remove liquid blister agents from the skin by using the items of the M258A1 kit. If burns or blisters develop on the skin, cover them with sterile gauze or a clean cloth to prevent infection. Seek medical aid quickly.

Blood agents. The symptoms of blood-agent poisoning are nausea, dizziness, throbbing headache, skin/lips red or pink, convulsions, and coma. If those symptoms appear, hold two crushed ampules of amyl nitrite to the victim's nose. If in a contaminated area and the victim is wearing the protective mask, insert the crushed ampules inside the protective mask. If symptoms persist, repeat the treatment, using two crushed ampules about every 4 or 5 minutes until normal breathing returns or until eight ampules have been used. Breathing may become difficult or stop. Seek medical aid quickly.

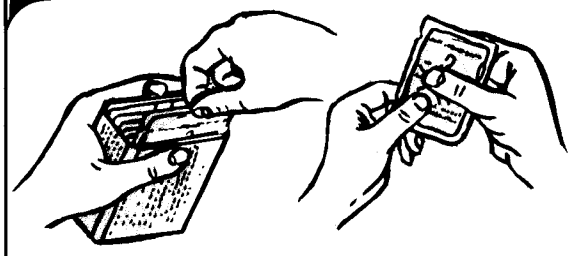
Choking agents. The symptoms of choking-agent poisoning are coughing, choking, tightness of the chest, nausea, headache, and watering of the eyes. If you have these symptoms, stay quiet and comfortable, but seek medical aid quickly.

CHEMICAL-AGENT DECONTAMINATION OF SOLDIERS AND INDIVIDUAL EQUIPMENT

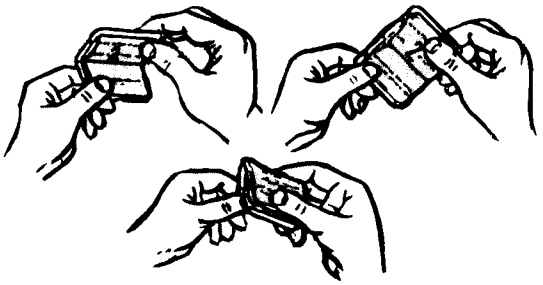
Use the M258A1 skin decontaminating kit to decontaminate your skim individual weapons, and equipment. Instructions for the use of the kit are printed on its container. This kit is especially made for skin decontamination however, you may use it to decontaminate some personal equipment such as your rifle, mask, and gloves.

The container for the M258A1 kit is a plastic waterproof case with a metal strap hook for attaching to clothing or equipment. It contains three Decon 1 wipes and three Decon 2 wipes, sealed in tear-away envelopes. Each Decon 1 wipe packet has a tab attached for night identification and to assist in removal from the case.

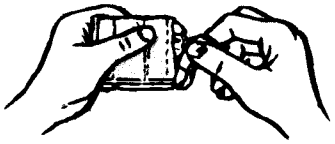
OPERATING INSTRUCTIONS FOR M258A1 KIT



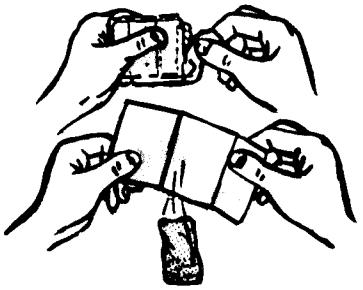
1. Pull out one Decon 2 packet. Crush inclosed glass ampules between them and fingers or smash glass ampules with palm of hand.



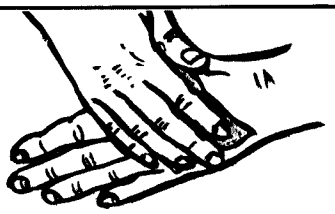
2. Fold packet on solid line marked crush and bend, then unfold.



3. Tear open quickly at notch and remove towelette.



4. Fully open towelette, let the encased crushed glass ampules fall away.



5. Wipe or swab exposed skin for 2 to 3 minutes. Start with hands then neck and ears. As necessary, bury the towelette and decon packets under several inches of soil.

CHEMICAL-AGENT DECONTAMINATION OF UNIT EQUIPMENT

Decontaminate key weapons with DS2 decontaminating solution, soapy water, solvents, or slurry. After decontamination, disassemble weapons and wash, rinse, and oil them to prevent corrosion. Decontaminate ammunition with DS2 solution, wipe with gasoline-soaked rags, and then dry it. If DS2 is not available, wash ammunition in cool, soapy water, then dry it thoroughly.

Decontaminate optical instruments by blotting them with rags, wiping with lens cleaning solvent, and then letting them dry.

Decontaminate communication equipment by airing, weathering, or hot air (if available).

BIOLOGICAL-AGENT DECONTAMINATION

Decontaminate your body by showering with soap and hot water. Use germicidal soap if available. Clean your nails thoroughly and scrub the hairy parts of your body. Wash contaminated clothing in hot, soapy water if it cannot be sent to a field laundry for decontamination. Cotton items may be boiled.

Wash vehicles with soapy water (prefer ably hot). If possible, steam-clean them using detergent.

Wash equipment in hot, soapy water and let it air dry.